

THE DIRECTOR'S REPORT

THE ARNOLD ARBORETUM DURING THE FISCAL YEAR ENDED
JUNE 30, 1958

IT IS WITH PLEASURE that I report another year of excellent progress in the care and use of the living collections, the improvement of the herbarium and library and the contributions of the various staff members. A dry summer, followed by a wet winter marked the climatic year; nevertheless, the fine display of flowering shrubs, trees and vines seen in the Arboretum during the spring gave evidence of the care they had received throughout the months of difficult weather conditions. An increasing number of visitors has been recorded and, of these, the registration book in the Administration Building indicates visitors from thirty-eight states and seventeen foreign countries. In addition to the regular work assignments of the staff, the answering of all types of horticultural questions by letter, by phone, or for individuals calling at the office in person consumes a considerable proportion of the staff working hours and is an indication of the confidence which the public places in the Arnold Arboretum.

Among the highlights of the year were the visits of distinguished colleagues from this hemisphere and abroad. In all, directors or representatives of twenty-three botanic gardens and arboreta visited the Arnold Arboretum during the year. The visit of Dr. George Taylor, director of the Royal Botanic Gardens, Kew, a newly appointed member of the Board of Overseers Committee to Visit the Arnold Arboretum, was of special interest and pleasure.

The Staff:

I am pleased to report the approval of the Harvard Corporation for the promotion and appointment without limit of time of Dr. Carroll E. Wood, Jr., as associate curator of the Arnold Arboretum. This appointment is well deserved and is indicative of the contribution which he has made to the Arboretum.

Mr. Roger Coggeshall, who has been chief propagator at the Arboretum since 1954, resigned to accept a position with a private nursery in Massachusetts. Mr. Coggeshall has done an excellent job in increasing the living collections, in research on the propagation of woody plants and in teaching popular classes in the education program conducted by the Arboretum. We regret his leaving the staff, but wish him success in his newly chosen field. He will continue, however, to assist in the instruction program in plant propagation at the Arboretum.

Mr. Alfred Fordham has been reassigned and promoted to the position of chief propagator. Mr. Fordham began his work at the Arnold Arboretum

as assistant to Mr. William Judd in plant propagation. He received further training in this field as an exchange student from the Arboretum to the Royal Botanic Gardens, Kew, England, before the beginning of World War II. Upon his return to the Arboretum, following a leave of absence for war service, he was appointed assistant superintendent of buildings and grounds. We are pleased that Mr. Fordham is again serving in a capacity which will permit him to use his specialized training.

During the year Dr. Frans Verdoorn, holder of the honorary appointment as research associate at the Arnold Arboretum since 1942, accepted a new position as director of the Biohistorical Institute at the University of Utrecht, Holland. Dr. Verdoorn was born in Holland and thus that country regains not only a citizen but a remarkable botanical historian, as well.

Three holders of joint annual appointments with the Gray Herbarium accepted other positions at the end of 1957. Dr. Howard F. L. Rock, who was on the curatorial staff in the herbarium, accepted a position at the University of Tennessee. Drs. Robert Bennie Channell and Charles W. James, who, with Dr. Wood, were working on a flora of the southeastern states, accepted teaching appointments at Vanderbilt and the University of Georgia, respectively. To fill one of the latter positions, the joint appointment was made for Dr. Kenneth Wilson to work with Dr. Wood on this project.

Horticulture:

During the summer of 1957 the Arboretum experienced the worst drought on record. All but one of the ponds on the grounds dried up completely and the remaining one retained but a few inches of water. As the drought lengthened and the available water in the soil was exhausted, wilting became a familiar sign in all shrub and tree collections. Emergency steps were taken to water all recently planted trees and shrubs and those others growing in especially dry areas. A pressure-driven deep-watering system was employed to supply water directly at the roots of some of the larger trees, especially those in the conifer collection. Although injury resulted to many of the plants in spite of our efforts, it now appears that only a few plants were killed completely.

In the late fall and winter the situation was reversed, with rains so unusually heavy that the ponds filled and overflowed with floodings that blocked the meadow road for a period of several days. With the assistance of maps from the City of Boston Parks Department, some long-unused drainage channels were relocated and opened to lower the water level. It would seem that this excessive rainfall during a period of mild temperatures partly offset the dry summer season. Flowering was affected in many plants, particularly the azaleas, and much branch damage was noted, which required heavy pruning during the spring.

A number of improvements have been made on the grounds during the year. The spectacular collection of torch azaleas on the South Street bank was thinned and weeded, a retaining wall was built around the

Kalopanax pictus bordering one of the ponds and in the lilac collection many older varieties between the path and the road were removed to locations farther up the bank, allowing newer varieties to be placed in the more conspicuous locations. It is our aim to bring together in a central location the Lilac Committee's "100 best lilacs." About half of these, all young plants, are now in their new locations.

A major adjustment was attempted in the *Carya* collection where a very few species and varieties dominated the area. A number of duplicate trees were removed, these to be replaced with taxa not currently in our collection. The area was cleaned to allow access to the newly opened woodland along Center Street, which is the area proposed for an expanded planting of *Ilex pedunculosa*, its relatives and other rarer species.

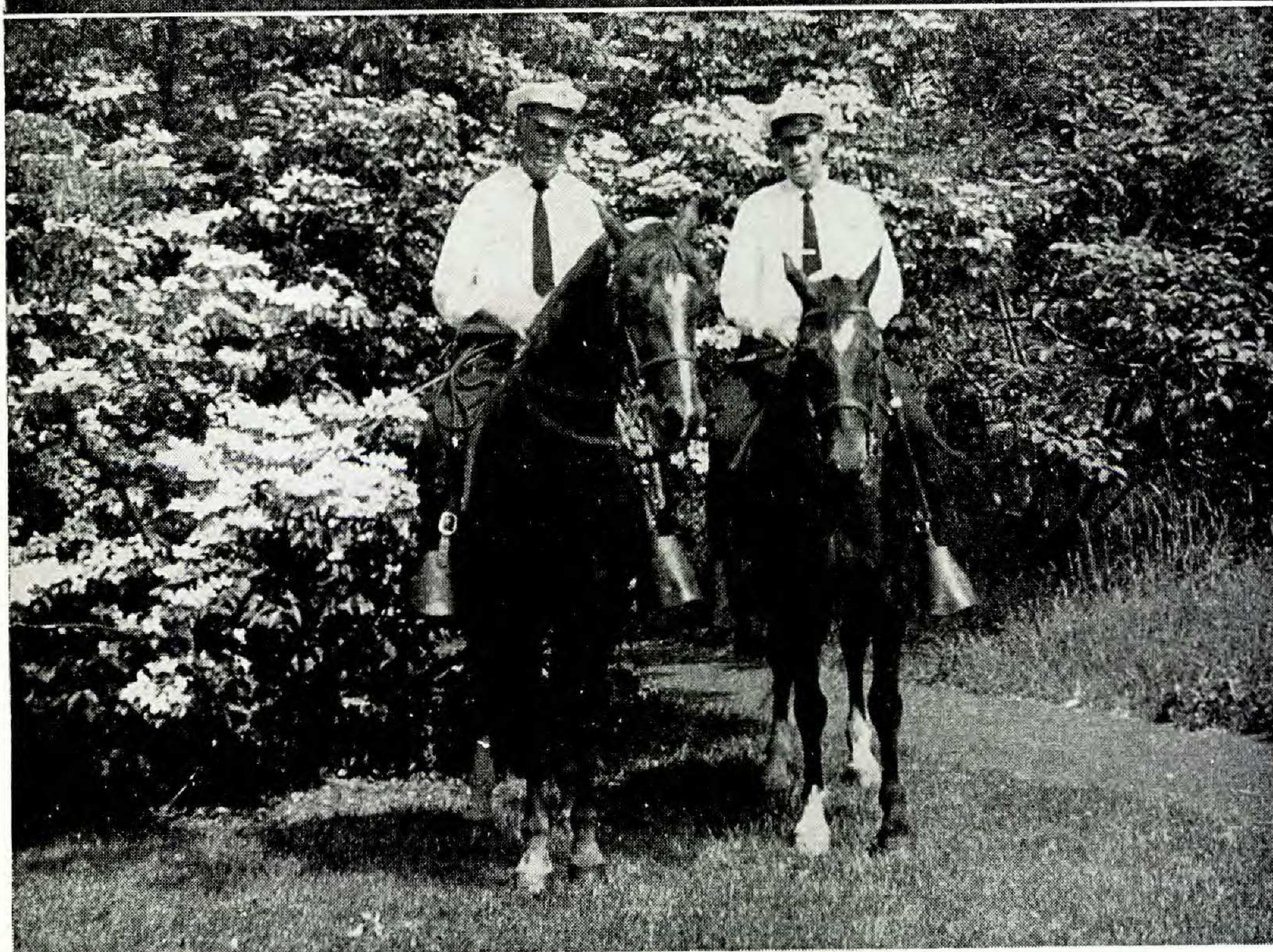
The Boston Parks Department continued cleaning the cobblestone gutters. The main portion of the Arboretum between the Arborway and Walter Street has been completed and work has started on the Peters Hill tracts. This work, neglected for many years, makes a striking difference in the appearance of the grounds. Unfortunately, it also calls attention to the poor condition of the roads in many places, a condition which we hope can be handled by spot repairs immediately and eventually by retarring or re-surfacing throughout.

Increased police protection was also granted by the Police Department, which assigned two mounted patrolmen to the Arboretum grounds during the spring season. Men on horseback are better able to patrol the remote areas of the Arboretum and can reach areas not accessible by patrol cars. The impressive riders and steeds have attracted considerable attention and have been photographed almost as much as the famed *Davidia*.

One new pest, the dogwood twig borer, was discovered in our collections this year. A heavy infestation of this insect was found in the *Viburnum* collections, apparently attacking all species, which may be the reason why some of the *Viburnums* have not appeared to be doing well. The location of the pest is extremely difficult. We now spray for this borer, combining the spray program with that for borers in the locust and mountain ash collections.

Dr. Donald Wyman has continued to act as co-ordinator for a group of botanic gardens and arboreta working in conjunction with the Horticultural Crops Research Branch of the U. S. Department of Agriculture. This group is responsible for bringing into the United States for trial growth under quarantine conditions those plants whose entry previously has been prohibited by law. Such plants are grown in special houses at Glen Dale, Maryland, for two or more years before being turned over to the arboretum or garden responsible for their introduction. During the year the Arnold Arboretum received a quarantine release on twenty plants previously held at Glen Dale. These plants originated in England, Germany and the Netherlands.

In continuation of the program of plant distribution established at the Arnold Arboretum seventeen years ago, fourteen new species and varieties were made available to cooperating nurserymen for propagation. In all 650



Above: "Up the hill." Photo and print by Mr. Henry Soron awarded a prize as the best black-and-white picture taken in the Arboretum.

Below: Officers Donahue and McNeil, two of the mounted policemen of the Boston Police Department now patrolling the Arboretum.

plants were distributed to thirty-four domestic nurseries, four foreign nurseries and ten arboreta and botanic gardens.

The number of new plantings on the ground during the year was slightly less than average. Individual plants added to the collection totaled 463, representing 221 species and varieties. Forty-one are new to our collections and eight are probably new to the United States.

Experimental work in the field of plant propagation, involving 646 species and varieties, continued in the greenhouses. One program concerned the propagation of native hybrid azaleas which are considered impractical to root on a commercial scale. A similar program for rooting Ghent azaleas under plastic was attempted. Various hormone concentrations were tried, with Hormodin No. 3 giving the best results. Once the cuttings were rooted the plants were placed under continuous light. Daylight was supplemented with artificial light for continuous illumination for a period of three months. The extended period of light caused a break in bud dormancy and the plants grew continuously. This appears to be a method for establishing hardier plants capable of being transplanted at an earlier age.

In a continuing experimental program of rooting Asiatic maples from cuttings, it was established that wounding the cuttings was definitely advantageous and that Hormodin No. 3 proved to be the best rooting hormone.

We were able to overcome the common double dormancy in seeds of *Cotoneaster* with the use of concentrated sulphuric acid. Seeds were soaked for two hours in the acid, washed well and stratified in plastic bags for three months at forty degrees Fahrenheit. This treatment produced a percentage of germination at the end of one year comparable to that normally obtained in the standard two-year treatment for seeds of this genus.

During the year 136 shipments, totalling 1137 species and varieties of seeds, living specimens, and propagating material, were received from institutions in the United States and ten other countries. We sent 26 shipments of seeds of 141 species and varieties and 320 shipments of propagating material or plants comprising 1328 taxa to sixteen countries besides the United States.

Two pieces of property owned by the Arboretum were recommended to the Corporation for sale and both were sold during the fiscal year. The tract of land at 310 South Street consisting of a house and barn with two acres of land was the gift of Mrs. Andrew J. Peters in 1953. After expending a considerable sum to fence the property and tear down a rambling frame addition to the basic brick house, it was discovered that the house was not structurally sound and could not be used as a staff residence. The property was on the Boston tax rolls at an inflated valuation, the taxes exceeding \$1500 a year. Protecting the property from vandalism proved difficult and its sale was recommended. The receipts from the sale of this property will be added to the Arboretum endowment.

The second property sold was the Butler property on Center Street, acquired as a residence for Dr. Merrill while he was director of the Arboretum and occupied by him until his death in 1956. Since the cost of repairing

this house was prohibitive, it was sold, together with the land on which it stands, and the proceeds of this sale will also be added to the endowment. By the disposition of these two pieces of property the Arboretum has been freed of two costly maintenance items.

Case Estates:

The plantings at the Case Estates include demonstration plots, nursery stock and plantings for hardiness testing. This area is attracting an increasing number of visitors each year. Particularly noticeable is the increase in requests from garden clubs and other horticultural organizations for guided tours through the area. During the year portions of the land were made available to staff members and graduate students of the Cabot Foundation, the Bussey Institution and the Biology Department for their individual projects, in addition to the land used for Arboretum purposes.

The desire of the Town of Weston to acquire portions of the Case Estates for schools was mentioned in the report for 1956-57. Both the director of the Arboretum and the Corporation made it clear throughout that the land would not be sold and that the town must take this tract by eminent domain. In a special town meeting in 1957 it was voted to take approximately seventy of the one hundred and forty-five acres then in the property. However, further recommendations of the School Site Committee resulted in a reappraisal of the town's school needs. After much discussion by the committees, officials and residents, the town finally voted to take a smaller tract of land, which proved to contain thirty-two and one-half acres, but at the end of the fiscal year the formalities involved in taking this land by eminent domain had not been completed.

The loss of this area will necessarily reduce our opportunity for expanding the work carried on at Weston, and will also reduce the usefulness of the Case Estates to Harvard students, the Arboretum adult education classes and groups from the Weston schools. Any further inroads on the Arboretum land in Weston would raise serious problems affecting our ability to continue the important work now being carried on there.

During the early town meetings called for discussing the Weston school needs, there was a group which favored locating a new high school on the Case Estates in addition to the elementary school previously proposed. However, this proposal did not receive the necessary support and the town voted to acquire a privately held property some distance from the Case Estates for this purpose.

Education Program:

Two series of classes consisting of lectures, field trips and demonstrations were presented in the regular fall and spring adult education program this year. The field trips conducted by Dr. Wyman at Jamaica Plain remain extremely popular and were supplemented by a series of field trips called "Field Botany," conducted by Drs. Howard and Wood at the Case Estates in Weston. All classes were open to the public, with advance registration

essential, since in nearly all cases the class size was restricted. The courses are stimulating to students and instructors alike, but, regrettably, can not be expanded beyond the present effort. There seems to be an increasing demand for education in horticulture and botany through more popular, non-credit courses such as those offered in this program. Fortunately, five other organizations in the Boston area are now offering similar courses.

For nearly two months (from the last part of April until the middle of June), numerous groups visit the Arboretum for guided tours through the collections. Such tours are scheduled in advance and a maximum of six tours in one day has been accommodated. During other seasons the requests for tours are less frequent.

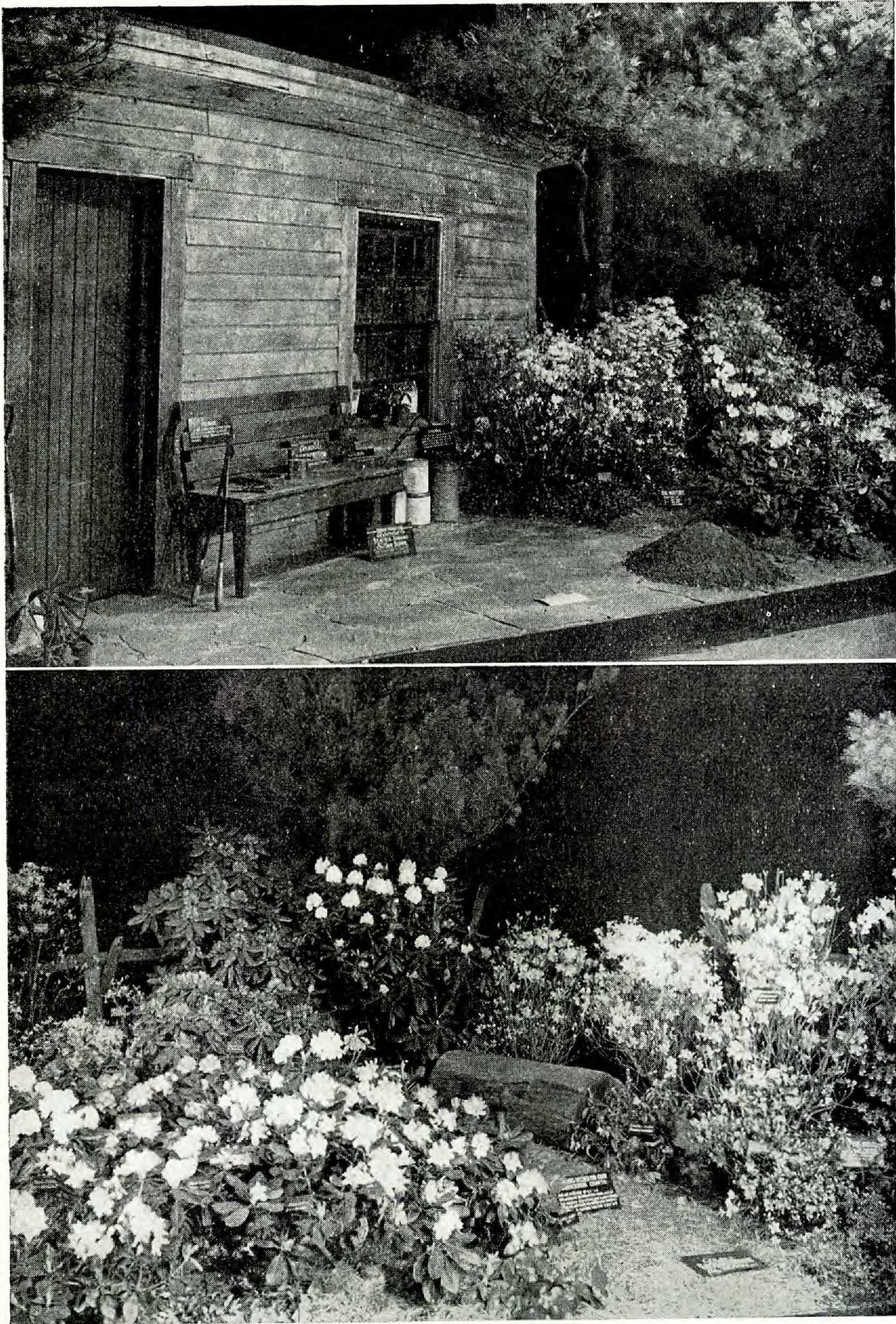
For the New England Zone meeting of the Garden Club of America which was held at the Arboretum in May, the staff assisted with a tour and the presentation of a display of tree peonies arranged by Mrs. George L. Batchelder, Jr. and Mrs. Ellery Sedgewick. The Librarian's Club of Boston also met at the Arboretum with the supervision of our librarian, Mrs. Schwarten. Tours of the grounds and a discussion of the services of the Arboretum staff were arranged. All available staff members were required during the Annual Field Day of the Massachusetts Horticultural Society held at the Arboretum. Seven buses were used for transportation during a two-hour conducted tour of the grounds. Since the buses could not seat all those who wished to take advantage of the tour, a separate caravan of cars supplemented the buses.

The Arboretum sponsored a special colloquium open to the public at the Biological Laboratories when Dr. George Taylor of the Arboretum Visiting Committee spoke on his work in Tibet. Colored slides illustrated his talk for the audience which nearly filled the hall.

Staff members represented the Arboretum at various meetings during the year. Dr. Howard gave the general lecture at the banquet of the Nurseryman's Short Course at the Waltham Field Station. Dr. Wyman took part in the refresher short course for arborists, also held at the Waltham Field Station. Dr. Sax attended the rootstock conference of the American Society for Horticultural Science and lectured on the production of dwarf fruit trees to the Plant Propagators Society and the New England Association of Nurserymen at their annual meetings. Drs. Howard, Kobuski and Sax attended the American Institute of Biological Sciences meetings in Palo Alto, California. Dr. Sax was reappointed as an American Institute of Biological Sciences lecturer and during the year visited Reed College, Lewis & Clark College and Whitworth College in Oregon and Washington, where he gave a series of lectures on world agriculture and population growth.

Exhibits and Displays:

The Arboretum exhibit at the Spring Flower Show of the Massachusetts Horticultural Society again won a gold medal as well as two special awards. One of the latter, from the Massachusetts State Department of Agriculture, was a new award at the show this year. The exhibit theme, "A Hobbyist's



Two views of the exhibit of the Arnold Arboretum at the Spring Flower Show held at Mechanics Hall. The exhibit was titled "A Hobbyist's Rhododendron Garden."

Rhododendron Garden," attempted to show the full program of care and selection necessary in producing fine rhododendrons. The Beatrix Farrand Silver Bowl for the best display of rhododendrons was won by this exhibit.

The open house held at Weston in early May was announced in the Weston and Wellesley papers and was well attended by people from these areas. We trust that those who attended gained a better appreciation of the function of the Case Estates in the program of the Arboretum. It is pleasing to learn that many garden clubs now carry the open house date on their schedule of coming events.

In co-operation with the Boston Camera Club, a contest was held for the best black-and-white photographs and the best kodachrome slides taken in the Arboretum during the past year. It was interesting to the staff, who acted as judges in the contest, to get a glimpse of those scenes and those individual plants which caught the eye and the imagination of the outsider. The best black-and-white print was made by Mr. Henry Soron of Arlington and showed a small boy walking on Bussey Hill in the elm collection. The best kodachrome slide of a general scene was taken by Robert Spooner of Brookline and showed the Sargent cherries near the Administration Building and the open field of daffodils and narcissi. Mrs. Karin Engstrom of Buzzards Bay won two prizes for the best close-up and the best pattern shot. The former was of *Magnolia soulangiana* var. *rubra* showing a mature flower and a pubescent bud. The latter was a beautiful picture of the trunk and adventitious shoots of *Cercidiphyllum japonicum* enhanced by backlighting. The contest for the best slide showing the horticultural value of a single plant had the most entries and the judges concluded that the outstanding slide was of a *Pseudolarix amabilis* in fall foliage taken by Mr. George Taloumis of Salem. The contest served to bring photographers to the Arboretum at all seasons of the year, judging from the entries.

Library:

The year 1957-58 brought to a completion the first stage in combining the non-horticultural collections of the Arboretum with those of the Gray Herbarium and several other selected collections. Mrs. Schwarten and her staff have successfully united, recatalogued and reconditioned these books in the Harvard University Herbarium Building. This action was voted by the Harvard Corporation on January 19, 1953, and progress toward this end has been indicated in previous annual reports. The physical properties of air conditioning, providing controlled humidity and temperature in a dust-free atmosphere, ensure a longer life for these books. The new arrangement has already demonstrated that increased efficiency is possible in the use, as well as in the care of these volumes. Only the pamphlet collection remains in need of reorganization.

In the course of this project, a relatively small number of duplicate

books were found and set apart as reserves; these are shelved in a separate section of the library. These include volumes which are not presently needed and those held as replacements for volumes which receive much use. Duplicates of monographic treatises and special family studies have been placed on special shelves in the herbarium adjacent to the herbarium specimens of the families concerned. The unification program also allows greater office use or long-term use of these duplicate volumes by staff members.

In the course of the unification work in the library, the director and the librarian of the Museum of Comparative Zoology made available for our use a large room for work and storage. We are particularly indebted to them for this kindness.

The bound volumes added to the library during the year numbered 465. These included 212 volumes transferred to our library from the libraries at Widener, the Biological Laboratories and the special paleobotanical library. Also included are 145 volumes dealing with horticulture which were added to the library in Jamaica Plain. The total number of bound volumes accessioned now is 50,204. Pamphlets totalling 305 were added to the collection which numbers 16,573.

The horticultural library in the Administration Building in Jamaica Plain was also reclassified and portions of it rearranged for more convenient use by the staff. Additional library shelving was erected on the second floor to house special collections. As previously indicated, 145 bound volumes were added to this collection. The renumbering of all volumes in the horticultural library has been initiated.

A set of the Gray Herbarium Index to American Plants is maintained at Jamaica Plain and 3,000 cards in four issues were received and are being added to this collection.

Again this year the number of requests for books on interlibrary loan remains inconveniently high. Much as we wish to aid other workers, it is impossible to honor all requests for books to be sent on loan to other institutions. Where possible, requests for descriptions or passages are met by sending typed, photocopied or microfilmed copies of the pages needed and many other requests are referred to libraries within the home state of the individual requesting the loan. In addition, no book over one hundred years of age is ever sent from our library on interlibrary loan. Nevertheless, 217 volumes were sent out. The postage on such loans is usually paid by the borrowing library, but the general wear and often the real damage to the books is an expense we must bear. In contrast to the herbarium, where loans sent to staff members in other institutions may be somewhat offset by those received for the use of our own staff members, the interlibrary loan requests made by Arboretum staff members rarely exceed a dozen in the course of a year.

I wish to express my appreciation to Mrs. Schwarten and her staff for the concentrated effort they have made and the results they have obtained in bringing the library to its present excellent condition.

Herbarium:

It is now possible to report significant progress in the unification of the non-horticultural herbarium of the Arboretum with that of the Gray Herbarium. This work should be completed within the ensuing year. The additional funds made available for this task by the Harvard Corporation have enabled us to employ additional botanists who, with the herbarium staff, have made excellent progress. The details of this work have been discussed in previous reports. During 1955-56, the first year of this work, 103 families were integrated. In 1956-57, an additional 66 families were completed. During the last fiscal year 94 families were organized, leaving only 43 from a total of 306 families represented in our herbarium to be integrated. However, these 43 families include such large woody groups as the Rosaceae and the Leguminosae, as well as primarily herbaceous families such as the Gramineae, Cyperaceae, Compositae, Liliaceae and Ranunculaceae. The progress that has been made is satisfactory and the results encourage an even greater effort. The ease in using the reorganized and combined collections has demonstrated that the integration is well worth the time and effort expended.

As the work proceeds, excessive duplication in some areas within the collections has become evident. For example, in an experimental project it was found possible to remove 1058 sheets (either Arnold or Gray) from the Pinaceae and 23 sheets from the genus *Asimina*. Such sheets are either exact duplicates or sterile specimens represented by better material from the same geographical location. The unification procedure also has revealed a large number of herbarium sheets needing repairs. During the course of the year our mounter repaired 2302 sheets in addition to mounting for insertion 5535 sheets. The total number of specimens in the Arboretum herbarium as of July 1, 1958, therefore, is 699,452.

During the year 11,516 specimens were received by the herbarium. We received by exchange 6970, by subsidy 2708, by gift 1055, by special exchange 682 and for identification 101 specimens. The collection obtained by subsidy represented a set of plants obtained by Mr. Leonard Brass during the Fifth Archbold Expedition to New Guinea and adjacent islands. While the Arnold Arboretum had subsidized and handled all the botanical collections of the earlier expeditions, it was not able to do so in this case. A special collection of plants from Hong Kong and the vicinity was obtained in exchange for publications. In total, we received 993 specimens from the Western Hemisphere and 10,523 from institutions in or working on the floras of the Old World. These figures reflect the Arboretum's historical interest in the flora of Asia.

As a service to our colleagues, specimens from the herbarium of the Arnold Arboretum are sent on loan to recognized institutions. In turn, our staff borrows specimens from other herbaria to assist in their studies. The shipment of specimens on loan is necessarily an involved bookkeeping procedure. If the request is specific it may be necessary to send only a single specimen. Often, however, the request will be for a group of species, a

genus, specimens from a certain geographic area, or representatives of several families. Each loan request must therefore be handled individually and may involve a few minutes or a full week of work. When the specimens have been withdrawn from the herbarium, a record of the loan is made in the herbarium and in special files. Thus we know at all times the location of our herbarium material. The specimens, carefully packed to prevent breakage, are shipped by express collect within the United States, but must be prepaid and insured when shipped outside of the United States. Notice of the loan and the total count is sent in a separate letter with a return slip to indicate the safe arrival of the loan. When the borrower has finished his studies the specimens should be packed with equal care and returned promptly. All specimens returned are immediately fumigated, counted and checked against the original record to insure the receipt of the material originally sent. The herbarium sheets are then examined to determine the conclusions of the study and, if the sheets are properly annotated, they are filed according to the classification suggested. Specimens of cultivated plants from the horticultural herbarium in Jamaica Plain are added to the loans of spontaneous plants or sent separately for special study as required. Thus a great deal of time is consumed in the preparation and return of a simple loan request.

During the past year the staff sent from the combined herbaria 95 loans averaging 141 sheets and totalling 13,411 sheets. Sixty of these loans went to institutions within the United States and 36 to institutions outside of the country. In contrast, during the same period our thirteen staff members and students made 71 requests for loans from 44 American and 27 foreign herbaria, for a total of 8,614 specimens borrowed.

Routine work continues on the herbarium of cultivated plants in Jamaica Plain. A start has been made on the project of locating the type specimens of horticultural taxa described by Professors Alfred Rehder and Charles Sargent. During the year there was an increase in the requests for representative specimens, kodachromes or black-and-white pictures of cultivated plants.

In preparation for his "Manual of Cultivated Trees and Shrubs" and the "Bibliography of Cultivated Trees and Shrubs," Professor Rehder maintained a card file of references to original publications and to illustrations of cultivated plants. After Rehder's death the administrative decision was made to curtail that work. This decision was unfortunate, since the reference file soon became of limited value. With the recent adoption of an international code of nomenclature for cultivated plants, the need for an up-to-date index of published cultivar names, together with references to illustrations, became imperative. Therefore, during the past year Miss Ethel Upham, formerly of the Arboretum staff, began the work of bringing up to date the "Rehder Index." Over six hundred cards have been added to the file in the past year and it is expected that in two years the index will be current.

The staff members continued to spend a small part of their time on individual research projects. Unfortunately, this time has been limited in

the past three years and will continue to be for the ensuing year or until the herbarium integration is complete.

Dr. Howard continued his several projects supported by special research grants. Progress was made in the survey of the anatomical structure of the petioles of flowering plants and a report on this work was given at the International Horticultural Congress. His work on the West Indian vegetation was restricted to the vegetation in relation to bauxite subsoils, and the flora of the Lesser Antilles. A monographic study of the genus *Coccoloba* continues with final treatments prepared for the Lesser Antilles and Trinidad and the record of the genus in cultivation.

Dr. Perry returned from her trip to Europe, having profitably studied the New Guinea collections at herbaria in Great Britain, the Netherlands and Switzerland. In addition to herbarium work, Miss Perry continues her study of the materials from the 4th Archbold Expedition collected by Leonard Brass in New Guinea.

Dr. Hu had previously been working on a Flora of China supported by grants for that specific purpose. When the financial support was exhausted, Dr. Hu devoted her attention to regular Arboretum projects and has undertaken to identify the large accumulation of Chinese plants acquired by Dr. Merrill shortly after the end of the war. As sizable numbers of duplicates of these collections occupy our storage areas, the identification of the main set will enable the staff to distribute these collections within the next few years. Studies of the Compositae in China and miscellaneous monographic studies for the Flora of China have been completed and await publication.

Dr. Jarrett continued her work on the Moraceae and prepared several papers on *Artocarpus* for publication. Miss Jarrett has also developed an interest in the flora of the Philippines and is continuing that work which has been a tradition at the Arboretum.

Dr. Johnston reports that his work concerns the Boraginaceae of Texas and that work is in progress on the Chenopodiaceae and on the gypsum and serpentine floras.

Dr. Kobuski's heavy curatorial responsibilities which include supervision of the herbarium integration, have left him little time for his own research. The Theaceae continue to be his interest with special studies in progress on the genus *Ternstroemia*.

Dr. Wood assumed the responsibilities of editor of the Journal of the Arnold Arboretum with the January number of the current volume. He continued during the year his studies on the genera of seed plants of the southeastern United States; the genera comprising the woody families of the Ranales as they occur in that area were prepared for publication.

Mrs. Weber and Dr. Wilson, both of whom are on special projects, devote their full time to these. As a hobby of botanical interest, Mrs. Weber has prepared for publication a check list of the plants and plant families represented in philately. Dr. Wilson has readied several of his studies on ferns for publication and devotes his current research to further studies on this group of plants.

Comparative Morphology:

The assistance of I. W. Bailey, Professor of Plant Anatomy, *emeritus*, as curator of the wood and pollen slide collections is greatly appreciated by the staff. A number of wood samples and slides were added to the collections during the year. Requests for wood samples for study were mainly from scientists wishing to add such data to their taxonomic monographs. Fourteen such requests were filled from the wood collection and the herbarium.

During the year Professor Bailey received a grant from the American Philosophical Society in support of his research. His interest in the use of pollen in morphological studies centers now on the variations between fresh and processed pollen grains from herbarium material or fossil deposits. Professor Bailey's study of the anatomical structure of the stem in the Cactaceae continues to develop and he is accumulating samples for further work.

Cytogenetics:

Dr. Karl Sax, his assistant and students have reported the following contributions in the field of cytogenetics:

The mature trees of *Malus sikkimensis*, *M. toringoides* and an *M. sargentii* hybrid (AA 33340) usually breed true from seed when open pollinated, but occasionally they produce some segregates which differ from the typical in having larger flowers and fruits. Cytological studies show that the present trees are triploids.

The maternal-type progeny are also triploids, but the large-fruited types are tetraploids. Apparently the triploid parents are facultative apomicts which usually produce triploid progeny, but occasionally produce sexual segregates arising from a triploid egg cell and a haploid pollen grain from a nearby diploid species. Such progeny would resemble the maternal parent because of the excess maternal chromosomes.

Both *Malus sargentii* and *M. sargentii rosea* are facultative apomicts. Pollinated with pollen from a diploid *Malus* species, the progeny of the triploid *M. sargentii rosea* range from nearly diploid to approximately tetraploid, while the sexual progeny of the tetraploid *M. sargentii* are triploids.

Apparently the triploid parent produces egg cells ranging from haploid to triploid, although the apomictic progeny are triploids.

An issue of *Arnoldia* was published during the year reporting on the juvenile characters of trees and shrubs. Cuttings from suckers from the base of a seedling apple tree were found to root much more readily than cuttings from the fruiting branches of the same tree. The basal suckers are also juvenile in their leaf characters.

Instruction:

Although no formal courses were offered by staff members during the past year, both Dr. Howard and Dr. Sax continued to work with graduate

students on special problems. Mr. Claud Brown completed his work with Dr. Sax on pine hybrids and, after receiving his Ph.D. degree, accepted a position in forest genetics at Texas A. & M. College.

A series of luncheon seminars was conducted throughout the year in the lecture room at the Harvard University Herbarium Building. These seminars, in which the herbarium staff take part, provide an opportunity for the staff and graduate students to meet informally to hear papers by representatives of each group. The seminars also provide a means for visiting scientists to meet and talk with the staff without the usual disruption of work schedules.

Travel and Exploration:

Travel by staff members during the past year was divided between attendance at professional meetings, the presentation of invitational lectures and specialized field work connected with research programs.

The annual meeting of the American Institute of Biological Sciences is held each fall at a college campus in the United States. As such meetings offer the opportunity of observing other biology departments, gardens and herbaria, as well as of meeting with professional colleagues, staff members are encouraged to attend when possible. The 1957 meetings were held on the campus of Stanford University at Palo Alto, California, and Drs. Howard, Kobuski and Sax made the special trip. The California flora, both native and introduced, is strikingly different from that seen in New England and scheduled field trips for interested registrants afforded the opportunity of seeing the coastal range vegetation as well as a bit of the redwood forests. Special trips were made by Drs. Howard and Kobuski to the California Academy of Sciences to confer with colleagues there and to the Strybing Arboretum in Golden Gate Park. Mr. Coggeshall attended the Plant Propagators Annual Meeting at Cleveland and Dr. Sax attended the American Society for Horticultural Science rootstock conference at Geneva, New York.

Every three years an International Horticultural Congress is held which is attended by persons interested in horticulture from all over the world. The Fifteenth International Horticultural Congress was held in Nice, France, April 11-18, 1958. Dr. Howard represented the Arnold Arboretum at these meetings, presenting one paper and reading another for Dr. Kobuski. Prior to the meetings Dr. Howard visited botanic gardens in Denmark and Switzerland. During the Congress field trips were conducted to allow the registrants an opportunity of seeing the natural vegetation of the area and the commercial and private aspects of horticulture.

Following the meetings, Dr. Howard visited Paris for some work at the Muséum National d'Histoire Naturelle and also visited many of the famous parks and gardens of Paris. In and around London a schedule arranged by Dr. George Taylor allowed Dr. Howard to see several famous arboreta such as Westonbirt and many gardens, both public and private.

Dr. Hu attended the 9th Pacific Science Congress held in Bangkok,



Above: A group of the participants at a plenary session of the XVI International Horticultural Congress held in Nice, France.

Below: Members of the Congress during a visit to the Exotic Gardens at Monaco.

Thailand, and presented four papers at these meetings. Arranging her trip eastward and circling the globe, she was able to visit botanic gardens and herbaria in England, France, Italy, Switzerland, India, and several countries of Asia. Following the congress Dr. Hu visited Hong Kong and Macao for field work and study furthering her work on the flora of China. An exchange of specimens was also arranged by Dr. Hu between the Arnold Arboretum and both the Gardens Department, Hong Kong, and the Department of Botany, National Taiwan University.

Field work associated with individual research projects was carried on by several staff members. Drs. Wood and Wilson collected materials for their work on the flora of the southeastern states in Florida, where they were the guests of Mr. and Mrs. George R. Cooley.

Dr. Johnston spent the summer months doing field work in Texas.

Dr. Howard made another trip to Jamaica to continue his study of the vegetation on bauxite soils when several additional areas in St. Elizabeth Parish became available. The results of earlier studies showing the nature of plantings desirable for the rehabilitation of mined-out bauxite pits is now becoming evident as the mining scars are gradually being covered with forage grasses, crop plants and forest trees. A survey trip was also made to Hawaii to examine areas being considered for mining operations there. Following this trip Dr. Howard accepted an invitation to serve as advisor to the Commissioner of Public Lands for the Territory of Hawaii. He is to give special consideration to the problems of vegetation loss in strip-mining operations and to advise regarding rehabilitation procedures if mining is conducted in the Territory.

Gifts and Grants:

The response of the Friends of the Arnold Arboretum to the annual appeal made during the spring was most generous. Most gifts received were unrestricted and were assigned to the "gifts for cultural purposes" fund which is used to employ additional summer labor on the grounds where needed. This fund also supports a research assistant for Dr. Sax and an assistant in the greenhouses to help on plant propagation.

A special grant was awarded to Dr. Sax from the Massachusetts Society for Promoting Agriculture for work on rootstocks and for methods for promoting the growth and fruiting of fruit trees in New England. This project is being carried on in conjunction with the Bussey Institution.

Dr. Howard received a three-year grant from the National Science Foundation to continue work leading to a flora of the Lesser Antilles. Mr. George Proctor of the Institute of Jamaica, Kingston, Jamaica is co-worker on this project and will do the field work. During the last year Mr. Proctor visited Grenada and St. Lucia for major field work and spent a few days on other islands. Mrs. Dudley Hall assists Dr. Howard in the herbarium work of this project and is also supported by this grant.

A number of outstanding plant species were given to the Arboretum, either as living plants or as propagating material. The plants received

from Mrs. J. Norman Henry, and Mr. Orlando Pride were particularly noteworthy. Mr. A. G. Rotch presented to the Arboretum a portrait of the Arnold family painted by an unknown artist. He accompanied this with a genealogical summary which is a valuable addition to our historical records. The portrait, of considerable value beyond its special interest to us, is at present under the care of the staff of the Fogg Art Museum.

Publications:

Dr. Wyman edited the twelve numbers of *Arnoldia*, a bulletin of popular information which appeared during the year and Dr. Kobuski edited the *Journal of the Arnold Arboretum*, the quarterly issues of which serve the staff as an organ for the publication of scientific articles. Staff members have priority in placing manuscripts in the *Journal* and contributions from other individuals are by invitation or are papers based largely on the plant materials in the living collections or the herbarium and wood collections of the Arboretum. The *Journal* serves also as a medium of exchange for similar publications from other scientific institutions. The standards of the *Journal* have always been high and the excellence of the editorial work, together with the quality of the printing, has earned for it a good reputation in the field of scientific publications. For the last nine years the editor of this publication has been Dr. C. E. Kobuski, who has long been on the editorial board associated with the *Journal*. In fact, excepting only his leave of absence from the staff for war service, he has served continuously as associate editor or editor of the *Journal* since his appointment to the Arboretum staff in 1927. To him the *Journal* owes its direct, lucid style which, with characteristic regular date of issue, has become a hallmark of this publication. Dr. Kobuski has now asked to be relieved of his editorial duties in order to devote more time to his curatorial responsibilities in the herbarium and to his own research. Thus, with this volume the *Journal* becomes the editorial responsibility of Dr. C. E. Wood, Jr. Special acknowledgment to Dr. Kobuski was made in the January number of Volume 39.

One special publication was issued during the year. This was a photoreprint of "The Genus *Pinus*" by George Russell Shaw, issued previously as "Publication of the Arnold Arboretum, No. 5," in 1914. This publication has been out of print for many years but sufficient back orders had accumulated to merit a reprinting. To date, over 150 copies of this still important work have been sold.

It is with considerable pleasure that we note the presentation to Mrs. Susan D. McKelvey of the Sara Gildersleeve Fife Memorial Award, which was given in recognition of Mrs. McKelvey's contributions to botanical and horticultural literature. Mrs. McKelvey's works include "The Lilacs," "Yuccas of the Southwestern United States" and the recently published "Botanical Exploration of the Trans-Mississippi West 1790-1850." A full citation of the award was given in the *Garden Journal* of the New York Botanical Garden.